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Green computing: Environmental and ergonomical issues

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ABSTRACT

Green computing has become more of a concern among computer users in recent years as the environmental awareness increases. As with most environmental movements, green computing encourages people to reduce, reuse, and recycle. The paper concludes with some suggestions to achieve green computing.

INTRODUCTION

Computer applications are on the rise. The microcomputer revolution made computers available for use by individuals everywhere. As the use of computers grows, the concern for sensible and responsible computer usage increases.

Information technology energy consumption has increased five-fold in the last ten years. Each year, more and more computers are put to use. But it is not just the number of computers which is driving energy consumption upward. The way we use computers also adds to the increasing energy burden.

CONSERVING ENERGY

Computer systems account for nearly 5% of commercial electricity consumption nationwide. If action is not taken now, by the year 2000 this could rise to 10%. Much of this energy is wasted since nearly 40% of computer users keep their computers on even when they are not in use.

The Environmental Protection Agency (EPA) has signed partnership agreements with industry-leading manufacturers that sell 90% of all desktop computers and laser printers sold in the United States. They have developed the Energy Star computer program to develop energy-efficient computers, monitors, and printers. Energy Star office equipment has the potential to save

enough electricity each year to power Vermont, New Hampshire, and Maine. Energy Star equipment could cut electricity bills by two billion dollars and reduce carbon dioxide pollution equal to the emissions of five million automobiles.

Energy Star computers are designed to go to sleep after prolonged lack of use. This power-management feature on most Energy Star computers can be set by the individual user to adapt to his or her needs. A computer that sleeps generates much less heat than one that does not. This provides the user with the added benefit of a lower electricity bill and extends the life of the computer. Moreover, when a monitor is sleeping and the screen is dark, it emits lower levels of electromagnetic radiation.

President Clinton issued an executive order in April 1993 which requires all federal agencies to purchase only computers, monitors, and printers that meet Energy Star energy efficiency performance.

Screen saver programs save phosphorous in the monitor screen, but they are not effective energy savers. A screen saver displaying many images causes the monitor to consume almost as much electricity as it does when in active use. The best screen saver is to turn off the monitor when not in use.

RECYCLING AND REUSING

The second major area of green computing is recycling and reusing. Computer components can be recycled in the same way pop cans are recycled. Wasted paper can also be recycled. Before recycling wasted paper with only one printed side, it can be saved and used for rough drafts. Buying and using recycled paper should also be encouraged. Also, companies can use recycled plastics to make computers and other things.

Another way that computers and their components can be recycled is by remanufacturing. Companies take items such as printer cartridges, CDs, floppy disks, and hardware components, recondition them, and then resell them. Digital Equipment Corporation, for example, takes its unsold, obsolete, and used systems and upgrades them with new components. Then the corporation resells the systems with a one-year warranty at low prices. This industry is new, but it is growing rapidly because many companies that have adopted remanufacturing like Digital have been very successful. Not only are these companies making profits, but they are also saving on raw resources. In fact, companies where remanufacturing has been adopted as the main operation save an average of 85% of raw resources.

Besides the companies, consumers are receiving benefits as well. Usually, the remanufactured products sell for about half the original price. Even with low prices, the consumers are still receiving a quality product. Remanufacturers pride themselves on quality as much as any manufacturer. Some remanufacturers even claim that their products are superior. For example, Greendisks, a remanufacturer of computer disks, claims that their disks are higher in quality than the new ones. Greendisks takes never-opened packages of software disks and remanufactures them for resale. Software publishers usually use higher-quality disks than those typically

purchased by computer users. As a result, users have the opportunity to purchase a high-quality disk at a low price.

Some companies are using old parts in their new systems. Returned or obsolete items are tested and reused in the new systems.

Other companies are taking items that cannot be reused in new or remanufactured systems and sending them to recycling companies to be broken down and made into new products. For example, Greendisks recycles software manuals and plastic wrapping. Also, they recycle old floppy disks to make new ones or ship the plastic to China for use in credit card manufacturing.

Reusing items like this helps to extend the life of a resource after all other methods of recycling have been exhausted. Not only does the environment benefit, but companies who do this type of recycling also establish a good reputation among environmentalists and other conscientious businesses and customers.

Computers can also be recycled by donation. Companies and individuals may donate computers to non-profit organizations. There are many non-profit organizations that collect used computers and distribute them to schools, other organizations, and third-world countries in need of the technology. One example of a non-profit organization doing this type of work is the Boston Computer Society. California Allied Technology trades in old computers. These old computers are then reconditioned and sold to a third-world country.

ELECTROMAGNETIC POLLUTION

Computer monitors generate several types of potentially hazardous radiation. Although the correlation between the extremely low-frequency (ELF) electromagnet fields and the health of the computer users has not been established, care should be taken when using the computer. Distance should be kept and exposure to radiation should be limited.

SUGGESTIONS FOR GREEN COMPUTING

1. Turn off computers when not in use. A modest amount of turning computers on and off will not harm them.
2. Use one printer for a group of people.
3. Use an inkjet printer instead of a laser printer.
4. Use a black and white monitor if you do not need color.
5. Think before you print.
6. Do not turn on your printer unless you are ready to print.
7. Do not use large hard drives if you do not need them.
8. Do not turn on every piece of equipment upon entering the office.
9. Instead of using a screen saver, turn off the monitor.

10. Group all computer activities together and try to do them at the same time.
11. Educate others about green computing.
12. Recycle waste paper.
13. Use E-mail whenever possible.
14. Buy and use recycled paper.
15. Recycle toner cartridges.
16. Recycle computer diskettes.
17. Buy Energy Star equipment.
18. Look for green packaging.
19. Limit your exposure to the monitor radiation.
20. Keep your distance from the monitor.

CONCLUSION

As future energy shortages threaten, green computing practices are emerging as a relatively painless and effective way to reduce, reuse, and recycle. It will take an effort on everyone's part to become environmentally aware and concerned.

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